To complete this task, we'll use an Arduino Uno and a temperature sensor like the LM35, which outputs a voltage proportional to the temperature. We'll write a simple Embedded C code to read the temperature from the sensor and print an alert message if the temperature exceeds 50 degrees Celsius.

### **Required Components:**

1. Arduino Uno
2. LM35 Temperature Sensor
3. Breadboard and Jumper Wires
4. USB Cable (to connect Arduino to the computer)

### **Circuit Connection:**

1. **LM35 Sensor**:
   * VCC pin to 5V on Arduino
   * GND pin to GND on Arduino
   * Output pin to Analog Pin A0 on Arduino

### **Embedded C Code for Arduino:**

c

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const int tempPin = A0; // Pin where the LM35 is connected  
float temperature; // Variable to store temperature value  
  
void setup() {  
 Serial.begin(9600); // Start serial communication at 9600 baud rate  
}  
  
void loop() {  
 int sensorValue = analogRead(tempPin); // Read the analog value from the sensor  
 temperature = (sensorValue \* 5.0 \* 100.0) / 1024; // Convert the analog value to temperature in Celsius  
   
 // Print the temperature value  
 Serial.print("Temperature: ");  
 Serial.print(temperature);  
 Serial.println(" °C");  
   
 // Check if the temperature exceeds 50 degrees Celsius  
 if (temperature > 50.0) {  
 Serial.println("Alert: Temperature exceeds 50 degrees Celsius!");  
 }  
   
 delay(1000); // Wait for 1 second before reading the temperature again  
}

### **Explanation:**

1. **Setup**:
   * The setup() function initializes serial communication at a baud rate of 9600.
2. **Loop**:
   * The loop() function reads the analog value from the LM35 sensor connected to pin A0.
   * It converts this analog value to a temperature value in degrees Celsius. The LM35 outputs 10mV per degree Celsius, and the Arduino’s ADC gives a value between 0 and 1023 for a voltage between 0 and 5V. Thus, the formula to convert the analog value to temperature is (sensorValue \* 5.0 \* 100.0) / 1024.
   * The temperature is then printed to the Serial Monitor.
   * If the temperature exceeds 50 degrees Celsius, an alert message is printed.
3. **Delay**:
   * A delay of 1 second is added before the next reading to make the readings easier to follow on the Serial Monitor.

### **Steps to Test the Code:**

1. Connect the LM35 sensor to the Arduino as described in the circuit connection section.
2. Connect the Arduino to your computer using a USB cable.
3. Open the Arduino IDE and paste the provided code into the editor.
4. Upload the code to the Arduino Uno.
5. Open the Serial Monitor from the Arduino IDE (Tools -> Serial Monitor) and set the baud rate to 9600.
6. Observe the temperature readings. If the temperature exceeds 50 degrees Celsius, an alert message will be printed.

This code serves the purpose of monitoring the temperature in a textile industry dyeing and tanning process and provides an alert when the temperature exceeds the specified threshold.

